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UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

FOREST INSECT INVESTIGATIONS

RMD

FOREST INSECT SURVEYS - STANISLAUS NATIONAL FOREST

SEASON OF 1936

by
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Berkeley, California
January 22, 1937

Annex 1
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1936

U. S. GOVERNMENT PRINTING OFFICE 60918

Forest Insect Laboratory
Berkeley - California
January 22, 1937

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TABLE OF CONTENTS

	Page
EXTENT AND TYPE OF SURVEY MADE	1
GENERAL INFESTATION CONDITIONS	2
RECENT CONTROL WORK AND RESULTS	3
INFESTATION CONDITIONS IN UNIT AREAS	4
Moss Creek Unit	4
Anderson Valley Unit	5
Buck Meadows Unit	5
Crocker Ridge Unit	5
Tuolumne Unit	5
Jawbone Unit	5
Pinecrest Unit	5
Mt. Knight Unit	6
Calaveras Unit	6
Stanislaus Unit	6
Smoothwire Unit	6
Mokelumne Unit	6
RECOMMENDATIONS	7
TABLE I	8
MAP	9

FOREST INSECT SURVEYS - STANISLAUS NATIONAL FOREST

SEASON OF 1936

A general forest insect reconnaissance of the commercial stands of the Stanislaus National Forest was made in September and October, 1936. The purposes of this survey were twofold: First, to determine the amount of insect infestation which had developed since a previous survey made in the fall of 1935, and the present trend as compared with earlier infestations of known volume and characteristics; and second, the location of present centers, or concentration of sufficient intensity to demand control operations if any should exist.

In addition to the work done to obtain this information, areas where control projects had been carried out during the year were examined in order to determine the success of this work to reduce the insect losses on them.

The MS check plot in the South Tuolumne District was cruised to pick up the available 1936 loss data and to fill in that missed in the cruise of 1935. These data supply basic yearly records of the annual trend of the infestations in the entomological units to which they apply and together form a permanent record of insect activity throughout the regions covered by the Regional Survey which has been conducted each year since its inception in 1931.

EXTENT AND TYPE OF SURVEY MADE

The area covered by the survey includes the same territory encompassed by the survey of 1935, and is delineated by infestation units on the map, page 1. It includes all the pine stands within the forest that are capable of sustaining damaging infestations. The organization of the territory into entomological units, recognizable by type, contour, or other barriers, sufficient either partially or completely to isolate each as a more or less distinct infestation area is a method adopted for previous surveys and reports. It permits ready comparison of annual infestations on the various unit areas of the forest.

The general reconnaissance type of survey was considered sufficient and adequate for existing needs and was used throughout. Exceptions were made in certain areas where greater accuracy of results was desired. These were Aspen Valley check plot, covered by 100% cruise, and Pinecrest control area in which traverse strip cruises were run through types and elevations to ascertain the amount of reinfestation developed since the area was controlled in May, 1936.

The field work was carried out by members of the Bureau of Entomology and Plant Quarantine staff. G. R. Struble and J. S. Yuill assisted in the cruise of Aspen Valley check plot. J. E. Patterson, working alone, completed the survey of the other areas.

Since pressure of other projects prevented a thorough cruise of the established check plots located in Tuolumne, Jawbone, Calaveras, and Mokelumne units, these were examined by the methods used on other parts of these units. Previous experience has shown that a cruise made in the fall of the current year cannot be relied upon to give the total annual loss on these plots, since a subsequent cruise the following season is necessary to obtain all the loss data. Intensive cruises of these check plots are projected for next spring or summer when the complete data can be secured and incorporated in the permanent record.

For the purpose of securing data necessary to indicate positive infestation trends and to serve as a basis for recommending control work, the type of survey conducted was adequate and sufficient.

GENERAL INFESTATION CONDITIONS

In considering the infestation as a whole over the entire forest, its present low status is at once evident and striking. A comparison with losses of previous years shows a constant decrease since 1933. The present status is below normal for these forests. Some types of infestation have practically disappeared; while other types have persisted on certain local areas, though in greatly diminished losses. Infestations of the mountain pine beetle in sugar pine are practically non-existent. A few trees killed by this beetle were found near Pinecrest and in the Mokelumne unit, though their number is negligible.

Flathead barkborers and engraver beetles (Ips spp.) have almost completely disappeared from the marginal stands where they formerly took sizable toll of this low grade stumpage. The marginal forests of the Buck Meadows and Calaveras units are practically free of this type infestation. Since these beetles were responsible for almost 90% of the infestation of previous years, their disappearance has left these stands free from any damaging infestations.

During 1934 and 1935, the flathead borer, Melanophila drummondi, developed a highly epidemic infestation in the Douglas fir along the south side of the Tuolumne River. This infestation during its height bid fair to greatly deplete these fir stands. However, it subsided from natural causes late in 1935, and has now ceased to be a menace.

The unusual type of topkilling of ponderosa pine by Pityophthorus confertus, reported in last year's survey report, has disappeared over most of its former range on this forest. There are still a few recent topkills at Smith Meadows in the Buck Meadows unit that are the result of 1936 attacks, showing that this insect is still active at this place. It is probable, however, that this type of infestation will continue to decline.

The highly epidemic center of western pine beetle infestation that developed in 1935 at Mt. Knight has also subsided without spreading to adjacent areas. This epidemic was of short duration though of intensive character. It was given some prominence in last years report, though its control was not recommended because of the low values represented, and because its sporadic character was suspected at that time.

A summary of infestation conditions on this forest shows that all types of infestation have greatly decreased. Losses due to the mountain pine beetle, the Jeffrey pine beetle, flathead borers, and the engraver beetles (Ips spp.), are at present far below normal for this forest. The western pine beetle, which attacks only ponderosa pine, represents the bulk of the remaining infestation. The present status of this beetle compared with its former activities of recent years shows that it, too, has responded to natural control factors over a large part of its range. Recent control work in the Tuolumne, Jawbone, and Pinecrest units have brought it under definite control on these former epidemic areas. Current losses attributable to this beetle do not anywhere on this forest approach epidemic form.

RECENT CONTROL WORK AND RESULTS

Control of persistent recurring infestations of the mountain pine beetle in sugar pine, the western pine beetle in ponderosa pine, and the Jeffrey pine beetle and flathead borers in the Jeffrey pine on the Pinecrest recreational area was recommended in last year's report. This project was undertaken in May and was completed in June, 1936, with ERA labor under the supervision of Associate Forester R. E. Jones, and Control Foreman Glenn B. Head*. The project area was set up by Assistant Entomologist J. E. Patterson in early May and included the entire recreational area of reserve stands and a sufficient extent of surrounding logged lands to insure adequate protection against reinfestation from outside sources. The total acreage covered amounted to 4,500 acres. In all, 79 infested trees containing a volume of 159,870 board feet were treated. Of this total there were 32 ponderosa pine trees with a volume of 61,760 board feet infested with the western pine beetle; 39 Jeffrey pine trees containing a volume of 85,440 board feet, infested with the Jeffrey pine beetle, flathead barkborers and the large engraver beetle, Ips emarginatus; 6 sugar pine trees, volume 12,490 board feet, infested with the mountain pine beetle; and, 2 lodgepole pine trees of 180 board feet, infested with the mountain pine beetle. This work was accomplished with a maximum expenditure of $513.06. The cost per tree treated was $6.49 and $3.28 per M.B.M.

Considering the small size of the project and the scattered infestation treated these unit costs are unusually low. Despite the fact that the control work was not completed as early as it should have been, but was prolonged into June when some emergence had occurred from infested trees, it was successful in eradicating a high percentage of the infestation and prevented subsequent reinfestation of the stands during the balance of the 1936 season. An examination of the area made in October revealed only 2 trees that had been attacked and killed and only 3 topkilled trees which had appeared during 1936, the season following the work.

Control of a local infestation in ponderosa pine slash was carried out at the Folsom Peak lookout tower under the supervision of Associate Forester R. E. Jones during the period May 15 to June 1.

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* Report - Pinecrest Insect Control Project - Strawberry Unit - Stanislaus National Forest. By Glenn B. Head, Control Foreman. Sonora, California June 23, 1936.

This infestation resulted from attacks by the western pine beetle, the mountain pine beetle, Ips and flatheads, of a large number of trees felled around the tower in the early fall of 1935 to increase visibility. When these down trees were examined by Parsons and Patterson in October, 1935, beetles had already initiated attacks and several logs were developing heavy broods. The treatment of these logs in the spring of 1936, to prevent emergence and subsequent attack of nearby standing trees was recommended in the report of 1935.

Jones** reported that a total of 210 trees with a total footage of 150,000 board feet were treated. The total cost amounted to $512.56. The unit cost was $2.50 per tree and $3.41 per M.B.M.

An examination made by Patterson in October, 1936, showed that the situation was entirely cleared up and no standing trees in the vicinity of the slash had been attacked subsequent to the control work. It is suggested that peeling these logs at the time they were felled in 1935, could have been done at less cost and would, by preventing their attack, have accomplished the same end.

INFESTATION CONDITIONS IN UNIT AREAS

In the report of the 1935 survey the principal timbered areas of the forest were divided into entomological units which more or less corresponded to individual infestations represented within their limits. Since these units are generally bounded by ridges and other topographic barriers, or by change in type conditions which do not materially change, they continue to be the most convenient scheme for reporting annual infestations on this forest. These original units have been retained in the present report and are considered separately in the following discussion.

A summary of the estimated insect losses of 1936 for each entomological unit, and also for the entire forest, is given in Table I, in terms of trees and volume per section and per unit. These data are based on plot cruises in some cases, or on road traverse, sample plots, or topographic viewing.

1. Moss Creek Unit: Infestations during the year have been far below normal and have not aggregated a total loss of 10 trees per section throughout the unit. The few scattered dead trees, killed during the year, were attacked by the western pine beetle which appears to be the only insect active in these stands. A severe forest fire occurred in October and resulted in scorching a high percentage of the merchantable trees on the southern part of the unit. A buildup of the infestation may be expected on the burned area in the spring of 1937, due to the susceptibility of fire-injured trees to insect attack. The unit should be watched throughout the 1937 season of attack in order to detect any abnormal increase in the infestation.

** Folsom Peak Project, by R. E. Jones. Memorandum to J. E. Patterson, Sonora, California. June 30, 1936.

2. Anderson Valley Unit: On this unit the heavy concentration of infestations which followed the fire of 1934 subsided early in 1935 and has shown no tendencies toward increased losses since that time. The losses during 1936 were far below those of any of the preceding five years and averaged less than 10 trees per section. Extensive logging in adjoining stands are suspected of being the major factor accounting for this low status since slash created in the logging operations very probably attracted adult beetles from surrounding standing timber. No increase in infestations is expected on this unit in the near future.

3. Buck Meadows Unit: With the passing out in 1934 of the Ips-flathead infestations, which had been epidemic on this unit since 1931, recent conditions have greatly improved. The losses in 1935 were below normal and the same conditions prevailed throughout 1936. The only apparent infestation on this unit in 1936 consisted of scattered attacks by the western pine beetle and these did not exceed an average of more than 12 trees per section. There are no indications that an early increase in these losses will occur.

4. Crocker Ridge Unit: Infestation conditions on this unit are normal and the losses will not exceed 6 to 8 infested trees per section. It is expected that logging operations within the unit will operate to keep the infestation at this minimum point since sufficient fresh slash will be available during the flight period to absorb the greater part of the beetle population.

5. Tuolumne Unit: Losses due to insects have been greatly reduced since the control work in 1933 and 1934 was done. The present status of the infestation is estimated to be an average of 15 trees per section throughout the unit. The estimated loss in 1935 was 25 trees per section, showing that there has been a pronounced decline since that year. Increased losses are not expected to occur within the next year.

6. Jarbone Unit: Examination of this unit in October, 1936, showed that losses following the control work of early 1935 have been within the minimum for these stands. The estimated loss of 15 trees per section in 1935 was not exceeded in 1936. This low status is expected to be maintained for the next few years. The present infestation is confined largel to the poorer sites on the ridges and in the fringe type bordering the Tuolumne Canyon.

7. Pinecrest Unit: Control work in the spring of 1936 was successful in removing a high percentage of the western pine beetle-mountain pine beetle-Jeffrey pine beetle infestations which had persisted in these stands for a period of several years. The recurrent infestations during the balance of the 1936 season were entirely insignificant. An examination of the area made in October revealed a total of only 4 trees which had faded subsequent to the control work. It is, however, expected that some reinfestation will occur and that this low status will not be maintained for long because of the large percentage of overmature and susceptible trees in these recreational stands.

The protection of recreational forests, unlike that of commercial timber stands, is concerned chiefly with the saving of overmature trees which are highly susceptible to insect attack and of maintaining a higher degree of sanitation of the stands as a whole. Because of these requirements constant

vigilance is necessary in order to protect individual trees of great value and to prevent the occurrence of beetle-caused snags which become a potential hazard to buildings and other property. Their eventual removal is necessary in any case and they should be felled and treated before the beetle broods that killed them have emerged.

At present this area is practically free of insect infestations and it is recommended that periodic examinations be made in order to detect the first stages of recurring insect activity. Trees showing fading foliage should be promptly felled and treated while the fading is in the initial stages. Prompt action at such times will assure getting the infesting broods and will prevent other trees from being attacked.

8. Mt. Knight Unit: The western pine beetle epidemic which suddenly appeared in the marginal stands of ponderosa pine on this unit in 1935, just as suddenly subsided the same year. This epidemic, during its one season course, was estimated to have resulted in a loss of 50 trees per section. The loss in 1936 did not exceed 20 trees per section; a decrease of 75%. This subsidence was due entirely to natural causes. It may reappear soon due to the high susceptibility of these stands. The low quality of the stumpage does not warrant the cost of control measures, and the complete isolation of the unit prevents an infestation on it from endangering other stands.

9. Calaveras Unit: The marginal stands in this unit are highly susceptible to barkbeetle attacks and epidemic infestations have appeared in them during the past decade. The infestation of 1935 was low, averaging about 20 trees per section. That of 1936 is estimated to have been of approximately the same value. No immediate increase is expected although periodic examinations are suggested.

10. Stanislaus Unit: Type and stand conditions on this unit compare well with the Calaveras unit. Past infestations have followed the same cycle, with somewhat greater intensity. Infestations have been generally declining since 1933. The 1935 loss was estimated at 32 trees per section. That of 1936 did not exceed an average of 25 trees per section. Periodic examinations should be made in this unit since infestations can increase with surprising suddenness.

11. Smoothwire Unit: No pronounced change in infestation conditions has occurred since the survey of 1935. The infestation as a whole has slightly decreased, especially in the poorer sites along the Middle Fork Canyon. This is the opposite course it was suspected to take in the examination of last year. The current losses will average about 20 trees per section. This unit, like the preceding, should be examined at least once a year to detect any upward trend in the infestation.

12. Mokelumne Unit: Because of the high stumpage values represented in the stands on this unit insect-caused losses are of prime importance. These stands are also highly susceptible to attack and past epidemics have greatly reduced the footage on many local areas. The last epidemic period was from 1931 to 1934. Since that time the trend has been downward. A tendency toward grouping was pronounced in 1935, and conditions appeared to be critical. However, a general decline occurred in 1936, and with the breaking up

of group attacks, the infestation became scattered. The 1936 loss is estimated to have been about 25 trees per section.

RECOMMENDATIONS

Due to the general decline in infestations throughout the forest, and the successful eradication of beetles on the Pinecrest Unit, conditions at present are generally good and no immediate control work is recommended. While there are known areas where infestations can be considered even critical, the general status is such that they could become so within a short period. Annual, or more frequent seasonal, examinations in all the unit should be made in order to early detect any change toward increased losses. It is suggested that Rangers promptly report any observations of grouping of infestations, or fading of trees in unusual numbers, particularly on the poorer sites and in the more susceptible stands.

TABLE I - ESTIMATED INSECT LOSSES IN 1936 - PER SECTION AND UNIT - STANISLAUS NATIONAL FOREST

Unit	Timbered		Unit Tree Volume	Per Section		Per Unit		Loss per Acre B.M. 1936	Loss per Acre B.M. 1935	Increase or Decrease since 1935
	Secs.	Acres		Trees	Volume B.M.	Trees	Volume B.M.			
Moss Creek	12	7,000	900	10	9,000	120	108,000	15	22	-32%
Anderson Valley	14	8,000	1,100	10	11,000	140	154,000	19	50	-62%
Buck Meadows	80	51,200	650	12	7,800	960	624,000	12	12	0%
Crocker Ridge	12	7,000	2,000	8	16,000	96	192,000	27	95	-71%
Tuolumne	52	33,000	1,100	15	16,500	780	858,000	26	40	-35%
Jawbone	30	19,200	1,200	12	14,400	360	432,000	23	23	0%
Pinecrest	17	10,800	2,500	1	2,500	17	42,500	4	28	-86%
Mt. Knight	21	13,400	600	20	12,000	420	252,000	19	70	-73%
Calaveras	47	29,000	450	18	8,100	846	380,700	13	13	0%
Stanislaus	54	34,500	1,100	25	27,500	1,350	1,485,000	43	55	-22%
Smoothwire	44	28,000	1,200	20	24,000	880	1,056,000	38	55	-31%
Mokelumne	86	55,000	2,100	25	52,500	2,150	4,515,000	82	123	-33%
Totals -	469	296,100		186	201,300	8,119	10,099,200	321	586	
Total Averages -	39	24,675		15	16,230	677	845,000	27	49	-45%

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STANISLAUS NATIONAL FOREST

UNITS

1. MOSS CREEK
2. ANDERSON VALLEY
3. BUCK MEADOWS
4. BIG CREEK
5. SOUTH TUOLUMNE
6. JAWBONE
7. PINECREST
8. MT. KNIGHT
9. CALAVERAS
10. STANISLAUS
11. SMOOTHWIRE
12. MOKELUMNE

AREAS WHERE CONTROL WORK WAS DONE IN 1936

R.15E. R.16E. R.17E. R.18E. R.19E. R.20E.

T.7N T.6N T.5N T.4N T.3N T.2N T.1N T.1S T.2S T.3S